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**Crime and Mobility during the COVID-19 Lockdown:
A Preliminary Empirical Exploration**

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Crime and Mobility during the COVID-19 Lockdown: A Preliminary Empirical Exploration

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Abstract: In this research note we document the decrease in victimisation rates during the COVID-19 lockdown period in New Zealand. We show that the changes in mobility patterns in the same period are significantly correlated with these changes in crime rates. We discuss how our preliminary empirical results accord with the theories of crime in economics and criminology.

Keywords: COVID-19; crime; mobility; lockdown

JEL Classifications: K42; R00

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1 Introduction

On 29 December 2019, Chinese authorities notified the World Health Organisation of pneumonia cases of unknown cause, originating in Wuhan, Hubei province.¹ On 13 January 2020, the first case outside China was confirmed, in Thailand, and by 28 February the first confirmed case in New Zealand was reported. On 16 March, the New Zealand government banned some gatherings of more than 500 people, followed by bans on indoor events of more than 100 people on 19 March, and a closing of the border to most foreigners on 20 March. On 21 March, the Alert system was introduced, starting at Level 2, which restricted the sizes of gatherings and people allowed in a shared space, with an emphasis on social distancing and the ability to trace people’s interactions.² This was followed by the stricter Level 3 on 23 March, emphasising mixing of related and small “bubbles” of people known to each other, and then total lockdown for most people and most activities, or Level 4, by 26 March, lasting until 28 April with a return to Level 3 and then the return to Level 2 on 14 May. This timeline of increased restrictions of how many people could occupy a shared space and what activities they could do, represents, as Stickle and Felson (2020) describe, the largest criminological experiment in history.

What travel and activity restrictions and concerns about catching COVID-19 led to was a situation where most people spent a large fraction of their time at home, frequently in their small family bubbles, with many commercial locations empty of people. The result were changes in the opportunities and potential for different types of property crime and crimes against people. Furthermore, the probability of being caught committing some forms of crimes by the police could also have changed if police were focused on enforcing the social distancing, travel, and activity restrictions, than enforcing some types of criminal behaviour. Given these changes, natural questions are what did happen to criminal behaviour during this period and what might the response of criminal behaviour be in New Zealand once the restrictions were relaxed, especially in an economy potentially heading into a recession. In this paper we use Police Victimization and Google mobility data to provide a preliminary exploration of how the lockdown potentially affected criminal behaviour in New Zealand and on the basis of this speculate as to what we can expect to happen to criminal behaviour after it ended.

¹For details of the timeline of the COVID-19 pandemic see <https://nzdoctor.co.nz/timeline-coronavirus>.

²The specific conditions of New Zealand’s Level system can be found at <https://covid19.govt.nz/alert-system/covid-19-alert-system/>.

2 Literature

According to the literature on the economics of crime (Becker, 1968; Ehrlik, 1973), people choose to offend weighing up the expected benefits against the expected costs of the offending. This approach is supported by many empirical studies. For example, Machin and Meghir (2004) find falls in (relative) wages of low-wage workers leads to higher crime rates. Draca, Kutmerides and Machin (2019) find criminals respond rationally to changes in the value of goods. Metz and Burdina (2018) find increases in neighbourhood income inequality leads to higher property crime rates. Levitt (2004) and Levitt and Miles (2007) detail the deterrent impact of law enforcement and criminal punishment as a whole on criminal offending. Glaeser, Sacerdote and Scheinkman (1996) and Rotger (2019) find support for neighbourhood and peer effects, either as constraining factors (e.g. family values or neighbourhood monitoring) or promoting factors (e.g. greater social acceptability or knowledge how to commit crimes). For New Zealand, Papps and Winkelmann (1985) find lower unemployment rates are associated with lower crime rates. This theoretical framework and associated empirical findings is also consistent with criminal justice theories (see for example, Cohen and Felson (1979) and Clarke and Cornish (1985)) that offending rates depend on the presence or absence of likely offenders (i.e. people with fewer positive returns from legal activities), suitable targets (i.e. the presence of high value premises or people or goods), and the absence of suitable guardians (i.e. a lower probability of being caught).

Since a COVID-19 lockdown can potentially affect both costs and benefits (or the convergence of an offender, a target and an absence of a guardian), we could expect to see changes in criminal offending. For some crimes, we would expect to see decreases, but for others we could expect to see increases. For example, a lockdown results in much lower physical retail activity (fewer outlets open, and less cash and stock on-hand at retail premises), thus reducing the expected gains from theft from commercial premises. Furthermore, for a given level of policing, the chance of being caught breaking into a commercial business increases given an offender will stand out with so few other people around. The probability of being caught breaking into a residence would increase significantly given most people are at home and would detect it. The expected gain from time spent attempting to commit an aggravated robbery will likely fall as fewer people are around. Since people no longer congregate at bars, nightclubs and the like, with an absence of any non-material gain from a crime against a person, such as the psychic benefit from exerting

dominance, we would expect to see less violence away from the home. On the other hand, the expected benefit from trying to defraud people through cybercrimes could be expected to increase if more people are online and engaging in online spending. An additional factor relates to where police resources are devoted, the latter particularly true during a lockdown when police would be enforcing travel and other restrictions. If police resources were devoted to monitoring residential movement, this could have positive or negative effects on criminal offending. Jennings and Perez (2020) detail how various restrictions on a population’s activities in the United States during COVID-19 caused changes in policing behaviour, notably moving resources away from dealing with “low-level” crimes.

What would past experience with epidemics and crime tell us about changes most likely to happen in New Zealand in response to COVID-19? Unfortunately, to the best of our knowledge there are no studies of the relationship between previous epidemics and crime. Some studies of the impact of COVID-19 on criminal activity, using synthetic controls based on data from the most recent years, are slowly appearing but they are at best preliminary in their findings and involve social and cultural settings different from New Zealand’s and different strategies in dealing with the epidemic than New Zealand’s “go early, go hard” regiment. As a result, it is difficult to generalise from them at this stage. What has been found tends to be the following. Ashby (2020) in a study of crime in 16 large United States cities with various social distancing and stay-at-home orders from mid-January to early May finds they are associated with no change in assaults (public or residential), decreases in vehicle theft and residential burglaries, and no change in non-residential burglary. Piquero et al (2020) find evidence of a short-term transient spike in domestic violence from a stay-at-home order in Dallas. Mohler et al (2020) find statistically significant impacts of social distancing on some crimes in Los Angeles and Indianapolis, but with several differences between the two cities. Halford et al (2020) study crime rates in Lancashire in the United Kingdom for March 2020 and find that all recorded crime had fallen one week after lockdown. They also highlight that lags occur from a crime being committed to reporting of the crime, and this is likely contaminating the results for at least some forms of crime such as domestic abuse and online fraud. Payne, Morgan, and Piquero (2020) find that common assault, serious assault, and sexual offending all fell significantly, the latter two statistically significantly, in the month after social distancing regulations came into effect in Queensland. Payne and Morgan (2020) study various offence rates for the Australian state of Queensland during March 2020. While Queensland declared a public health emergency

on 29 January, most restrictions on people’s lives did not occur until mid-March, thus measured crime rates for the month might show little change from previous years. Even still, significantly lower rates were reported for shop and other thefts, and credit-card fraud. Reported rates of other crimes showed no statistical impact from the restrictions. Overall, the international evidence strongly suggests that the lockdown in New Zealand will likely have changed crime rates, but with uncertainty about how much each type of crime and location of the crime would be affected.

3 Data and Results

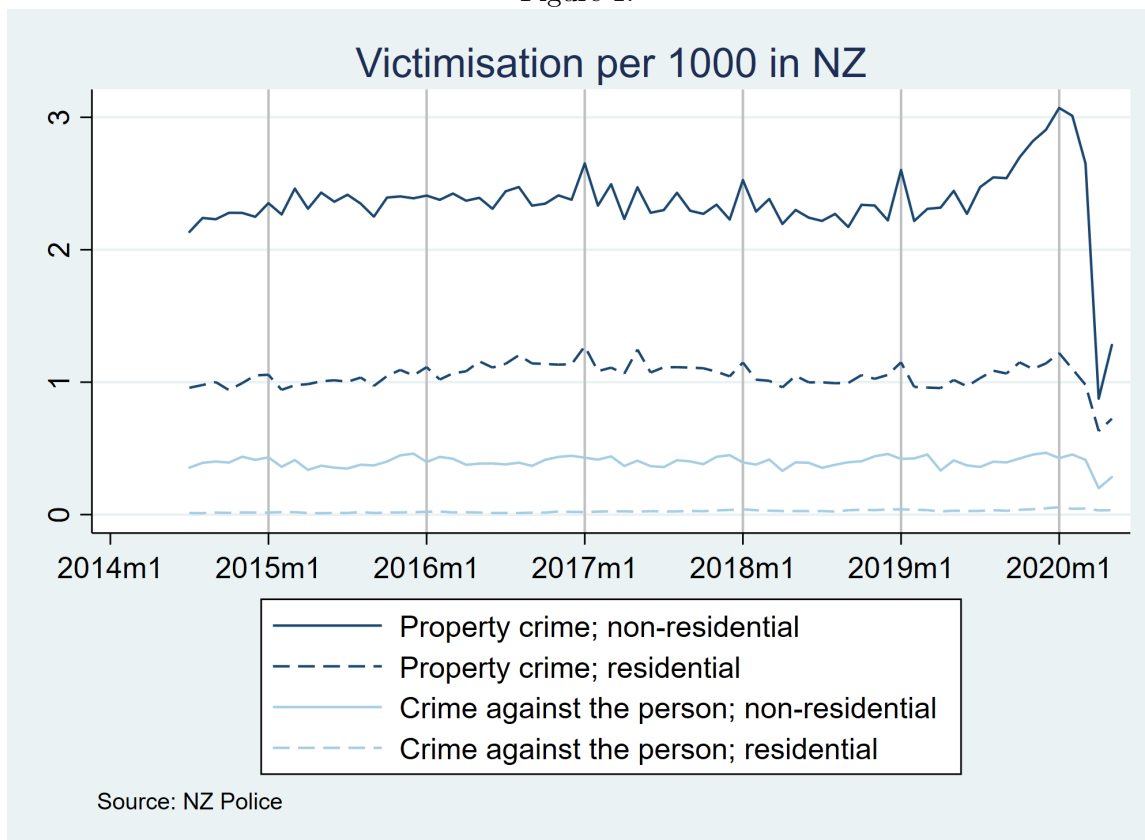
The main dataset is monthly victimisation reports to New Zealand Police from July 2014 to May 2020 (inclusive).³ Variables of interest include the number of victims (victimisation), ANZSOC (Australian and New Zealand Society of Criminology) division that denotes the type of crime, location, meshblock, month, and year. We group the 17 ANZSOC divisions into two broad types: property crime and crime against the person. We also group the various locations into two categories: residential and non-residential. We aggregate by type of crime and location over the entire country. We use quarterly country population to compute a rate per 1000 people, which allows us to better compare the data across time. We show these four time series in Figure 1. Victimization rates are fairly stable across all four broad categories from 2014 to 2018. Property crimes show noticeable spikes in January of 2017, 2018, and 2019 as would be expected from studies on weather and crime rates (McDowall, Loftin, and Powell (2012); Harp and Karnauskas (2018); and Horrocks and Mencolva (2017) for New Zealand). There is an increasing trend in non-residential property crime rates throughout 2019. The lockdown starting in March 2020 brings an obvious sharp decrease in victimisation rates across all four categories.

Table 1 reports the results of a simple regression model of victimisation rates against month and year fixed effects. January and 2015 are the omitted month and year, respectively. The lockdown indicator variable equals one in March, April, and May 2020, and zero otherwise. The month fixed effects control for the seasonality of certain crimes, while the year fixed effects control for broad changes in factors such as the macroeconomic environment or police resourcing.⁴ As the

³policedata.nz

⁴For example, New Zealand Police in their 2019 annual report state that constabulary numbers had increased from 8,814 in 2014 to 9,482 in 2019, suggesting, and unrealistically ignoring population and other changes, that the

Figure 1:



four columns show, the lockdown has a significantly negative effect on all four broad categories of crime. Within each column, comparison between the lockdown coefficient and the constant term gives us an idea on the magnitude of these decreases. Property crimes in non-residential locations decrease by more than half. Property crimes in residential locations and crimes against the person in non-residential locations decrease by about 30%. Crimes against the person in residential locations decrease by about 42%. The month fixed effects also accord with findings elsewhere that criminal offending tends to be highest over warmer months, for example December through to March, with January also being the month where people tend to be on a summer holiday with residential properties left unattended.

Table 1: Trends in victimisation rates

	(1)	(2)	(3)	(4)
<i>Type of crime and location:</i>	Property non-residential	Property residential	Person non-residential	Person residential
lockdown	-1.406***	-0.348***	-0.123***	-0.008**
<i>Month fixed effects:</i>				
January	—	—	—	—
February	-0.186*	-0.138***	-0.005	-0.002
March	0.086	-0.085**	0.030**	-0.002
April	-0.318***	-0.155***	-0.073***	-0.007***
May	-0.148	-0.069**	-0.021*	-0.007***
June	-0.203*	-0.113***	-0.038***	-0.007***
July	-0.138	-0.090***	-0.051***	-0.007***
August	-0.083	-0.063*	-0.019	-0.005**
September	-0.165	-0.083**	-0.022*	-0.004*
October	-0.080	-0.059*	-0.008	-0.002
November	-0.037	-0.060*	0.031**	0.001
December	-0.073	-0.051	0.038***	0.004
<i>Year fixed effects:</i>				
2014	-0.146	-0.041	0.003	-0.003
2015	—	—	—	—
2016	0.024	0.105***	0.014	0.002
2017	-0.005	0.103***	0.016*	0.010***
2018	-0.074	0.010	0.005	0.016***
2019	0.147*	0.034	0.020**	0.018***
2020	0.657***	0.133***	0.042**	0.032***
constant	2.477***	1.096***	0.401***	0.019***
<i>N</i>	71	71	71	71
<i>R</i> ²	.66647	.76418	.83781	.89962

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

probability of being detected committing a crime would have increased over this period. <https://www.police.govt.nz/about-us/publications/corporate/annual-report>

According to the routine activity theory in criminology, crime rates are determined by the combination of likely offenders, suitable targets, and the absence of capable guardians. The lockdown is likely to have a negative effect on the first two for certain categories of crime. From the perspective of the economic theory of crime, the lockdown is likely to decrease the expected benefit of certain categories of crime as, for example, fewer retail and other premises are open for shoplifting or theft to occur and fewer motor vehicles are left unattended for large periods of time to be stolen. We test these theories by regressing the changes in victimisation rate on the changes in mobility. As Figure 2 shows, the lockdown brings drastic changes to people’s mobility patterns, with a sharp decrease in most retail premises, including grocery stores and pharmacies, and a sharp increase in residential locations. The mobility time series across different regions are extremely similar. For this regression, we aggregate the victimisation data to the territorial authority level. (There are 66 territorial authorities in our dataset.) We then compute the year-on-year change in victimisation per 1000. We aggregate the mobility data from Google⁵ to the monthly level, and merge it with the victimisation data.

Table 2: Effect of mobility on victimisation rates

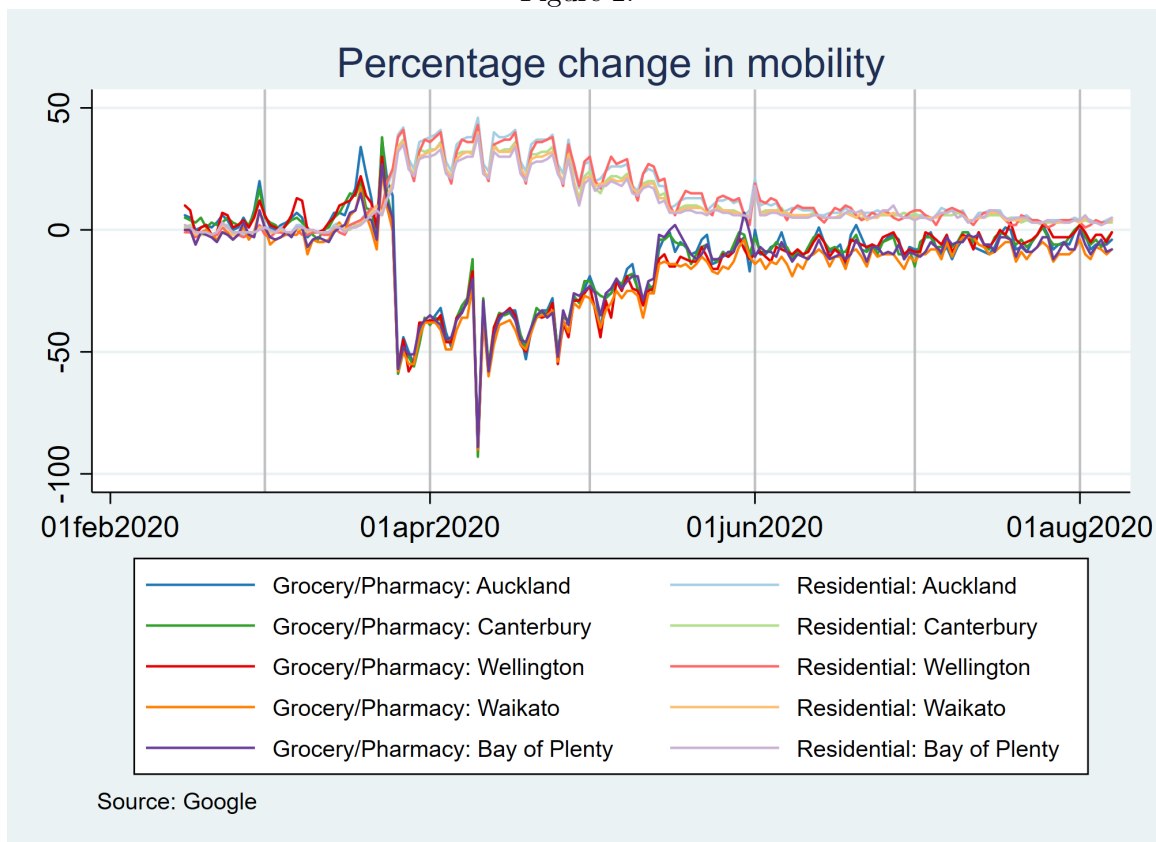
	(1)	(2)	(3)	(4)
<i>Type of crime and location:</i>	Property non-residential	Property residential	Person non-residential	Person residential
<i>Percentage change in mobility in:</i>				
Grocery/Pharmacy	0.001	-0.003	0.007**	-0.001
Residential	-0.050***	-0.015**	0.006	-0.001
constant	0.446***	0.105**	-0.053**	0.014*
<i>N</i>	211	211	211	211
<i>R</i> ²	.43839	.14585	.07878	.00523

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

These regressions show that changes in mobility do have significant effects on some categories of crime. An increase in mobility in residential areas is significantly correlated with a decrease in the rate of property crime, in both residential and non-residential locations. A decrease in mobility in the grocery store and pharmacy is significantly correlated with a decrease in the rate of crime against the person in non-residential locations. However, the rate of crime against the person in residential locations seems uncorrelated with either mobility measures.

⁵<https://www.google.com/covid19/mobility/>

Figure 2:



4 Discussion

While our analysis of the impact of lockdown on criminal behaviour is at an early stage, our results are suggestive that the lockdown did significantly impact reported crime rates in New Zealand. The lockdown is associated with falls in the rate of non-residential property crime by 1.4 crimes per 1,000 people (about a 50% fall), of residential property crime by 0.368 crimes per 1,000 people (about a 30% fall) and of crimes against a person in a non-residential setting of 0.123 per 1,000 people (about a 30% fall). At the population level, these imply large falls in the absolute numbers of crimes. The falls are not only statistically significant but economically significant. The rate for crimes against a person in residential settings saw a statistically significant fall, and was relatively large in magnitude. But, we are suspicious about this value for two reasons. First, it will include domestic violence (referred to by New Zealand Police as family harm) and, as discussed earlier, there is international evidence that domestic violence rates increased with lockdown type restrictions. Second, domestic violence cases are also well known for being under-reported and reported with delays, and thus the decrease might just be the result of measurement issues.

Our (preliminary) results accord with the theories of crime in economics and in criminology. The lockdown significantly changed where people were located and what they could do, and led to drastic changes in types and extent of economic activities by businesses. The Google mobility data clearly highlight this fact and the regression results suggest that these changes led to changes in criminal offending. Most commercial activities were shut, most motor vehicles were no longer left unattended while people were at work, and non-residential recreational activities did not occur. The expected monetary or psychic benefits from committing many forms of crimes fell without shops to shoplift from, motor vehicles to steal, people to rob or assault. In the criminology literature this would equate to a lack of suitable targets. Equally, the expected costs from committing many forms of crime would increase as offenders would stand out with a lack of people in non-residential locations and residential crimes would be more easily detected with most people at home during almost all of the day. In the criminology literature this would be the presence of guardians. Put these together, a substantial decrease in committing many forms of crimes and a substantial increase in their expected costs, it is not surprising that the overall numbers and rates of reported criminal offending fell. But these (suggestive) findings raise what we think are interesting questions. For example, what happened once the lockdown

ceased, did crime rates increase to previous levels and if so, how long did it take to do so? Given that the lockdown led to falls in crime rates, we would expect increases once the lockdown ended. What we do not know is if it returned to a similar level, or if there was pressure to make up for “missed crime opportunities”, in which case crime rates would be higher still, or if there was a “learning effect” and less criminal behaviour will lead to a continuation of lower crime rates. Were the falls uniform across geographic types (e.g. urban versus rural) or socio-demographic groupings (e.g. low versus high income groups)? What did happen to domestic violence during the lockdown period? Our next step is to answer these sorts of questions as well as carrying out more robustness checks of our preliminary results.

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